CLAIMS

I claim:

1. An encoding system that is configured to encode a first data stream and a second data stream, the encoding system comprising

a trellis encoder that includes

an encoder that provides at least

a first encoding gain, and

a second encoding gain that is larger than the first encoding gain, and

a mapper, operably coupled to the encoder, that provides at least

a first mapping gain, and

a second mapping gain that is less than the first mapping gain;

wherein

a first portion of bits of the first data stream is encoded by the trellis encoder with the first encoding gain and the first mapping gain, and

a second portion of bits of the first data stream is encoded by the trellis encoder with the second encoding gain and the second mapping gain, and

bits of the second data stream are encoded by the trellis encoder with the second encoding gain and the first mapping gain,

thereby providing the bits of the second data stream with a greater gain than either the first or second portions of bits of the first data stream.

2. The encoding system of claim 1, wherein

the mapper provides the first mapping gain and second mapping gain to outputs of the encoder via at least one of:

a programmable map,

a first map that provides the first mapping gain and a second map that provides the second mapping gain, and

a switch that alternately routes the outputs of the encoder to a constant map that provides the first mapping gain and the second mapping gain in dependence upon the routing of the outputs.

3. The encoding system of claim 1, further including:

a second encoding and mapping system that also provides at least the second encoder gain and at least the first mapping gain; and

wherein

the trellis encoder encodes the bits of the second data stream via the second encoding and mapping system.

4. The encoding system of claim 1, wherein

the trellis encoder comprises a plurality of encoding and mapping elements, and

the first data stream and second data stream are encoded by the encoding system via the plurality of encoding and mapping elements.

5. The encoding system of claim 4, wherein

the plurality of encoding and mapping elements correspond to a set of twelve encoding and mapping elements in an ATSC-compatible trellis encoder.

6. The encoding system of claim 1, further including:

a randomizer that receives the first data stream and the second data stream,

a Reed-Solomon encoder, operably coupled to the randomizer, that receives randomized data from the randomizer, and

an interleaver, operably coupled to the Reed-Solomon encoder, that receives error-correctable data from the Reed-Solomon encoder and provides interleaved data corresponding to the first data stream and the second data stream to the trellis encoder; and

wherein

the trellis encoder also receives a control signal that identifies which bytes of the interleaved data correspond to the first data stream and the second data stream.

7. The encoding system of claim 6, wherein

the encoding system encodes at least the first data stream in substantial conformance with ATSC standards for the transmission of digital television signals.

8. The encoding system of claim 1, wherein

the encoder is configured as a rate 2/3 encoder wherein three output bits are produced for each pair of input bits, and

when the second data stream is encoded, each bit of the bits of the second data stream is configured to form at least one bit of each pair of input bits, thereby transforming the rate 2/3 encoder to a rate 1/3 encoder, wherein three output bits are produced for each bit of the second data stream.

9. The encoding system of claim 1, wherein

the encoding system also encodes a third data stream,

such that bits of the third data stream are encoded by the trellis encoder with the first encoding gain and the second mapping gain,

thereby providing the bits of the third data stream with a lesser gain than either the first or second portions of bits of the first data stream.

10. The encoding system of claim 1, further including

a pre-processor that is configured to augment the second data stream with error correcting information.

11. A method of encoding a first data stream and a second data stream, comprising:

encoding a first portion of bits of the first data stream using a first encoding gain and a first mapping gain,

encoding a second portion of bits of the first data stream using a second encoding gain and a second mapping gain, and

encoding bits of the second data stream using the first encoding gain and the second mapping gain,

wherein

the second encoding gain is greater than the first encoding gain, and

the first mapping gain is greater than the second mapping gain,

thereby providing the bits of the second data stream with a greater gain than either the first or second portions of bits of the first data stream.

12. The method of claim 11, further including:

encoding bits of a third data stream using the second encoding gain and the first mapping gain,

thereby providing the bits of the third data stream with a lesser gain than either the first or second portions of bits of the first data stream.

13. The method of claim 11, wherein

the encoding of at least the first data stream is in substantial conformance with ATSC standards for the transmission of digital television signals.

14. The method of claim 11, further including

preprocessing the second data stream to augment the data stream with error correcting information.

15. A receiver comprising:

a trellis decoder that is configured to decode a first data stream and a second data stream, wherein

the trellis decoder decodes

the first data stream based on a first symbol map and corresponding first metric table, and

the second data stream based on a second symbol map and corresponding second metric table,

wherein

the second data map is configured to provide a higher gain to bits of the second data stream than the first data map provides to bits of the first data stream.

16. The receiver of claim 15, further including:

a de-interleaver, operably coupled to the trellis decoder, that reorders bytes from the trellis decoder,

a Reed-Solomon decoder, operably coupled to the de-interleaver, that corrects errors among bytes from the de-interleaver, and

a de-randomizer, operably coupled to the Reed-Solomon decoder, that reorders data from the Reed-Solomon decoder to provide packets corresponding to the first data stream and second data stream.

17. The receiver of claim 16, further including

a multiplexer, operably coupled to the trellis decoder, that is configured to order the bytes of the first and second data stream for processing by the de-interleaver,

wherein

the multiplexer receives a control input that controls a selection of bytes corresponding to the first data stream or the second data stream.

18. The receiver of claim 16, wherein

the receiver is configured to decode at least the first data stream in substantial conformance with ATSC standards for the transmission of digital television signals.

19. The receiver of claim 15, further including

a post processor that further decodes the second data stream via a subsequent error correcting process.

20. The receiver of claim 19, wherein

the post processor is enabled in dependence upon a control parameter in an MPEG header.